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Village of Pemberton Water Rate Review

Final Report
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KWL Project No. 0743.006

Prepared for:

Village of Pemberton

Village of PEMBERTON

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Executive Summary

Background

The Village of Pemberton retained Kerr Wood Leidal Associates in January 2013 to conduct a review of its water rate structure, with particular focus on the allocation of costs of service to the Pemberton North Water Service area and other customers outside the municipal boundary.

The Village of Pemberton (VoP) has grown rapidly in recent years (its population approximately doubling between 1997 and 2009), and VoP reports that the capacity of its water supply infrastructure is under stress. The total cost of water service (taxes and user charges) increased from $510,000 in 2006 to $604,000 in 2012.

For several years VoP has provided bulk drinking water supply service to the Squamish Lillooet Regional District's (SLRD) Pemberton North Water Service area (PNWS). The wholesale water rate, and the underlying calculation of cost of service sharing between the VoP retail water customers and its wholesale connections, has been disputed by SLRD since the current rate was set at $1.04/$m^3$ following VoP adoption of recommendations from a 2008 Water Rate Study. VoP notified SLRD in December 2012 that water service to the PNWS area might be discontinued if an agreement is not reached by December 31, 2013.

For the purpose of this review, the principles and objectives for establishing water service charges are assumed to include user-pay equity, full cost pricing, incentive to conserve water, stability of revenue, and transparency regarding how the rates are set.

Water Utility Information

Available information about the VoP water service was reviewed for the purpose of rate design. Water supply and retail demand data were analyzed to develop estimates of average and peak flows for each class of customer for allocating costs. Budget and asset valuation data was used to determine total costs of service and the share of costs applicable to each customer class.

The 2008 Water Rate Study Report was referenced throughout this review, and differences in approach are noted. In particular, the 2008 study did not include a rigorous process for allocating costs and distributing them to customer classes.

KWL interviewed SLRD staff to obtain information about PNWS assets, customers, and financial details. This information was used to gain an understanding of the implications of VoP bulk water charges on retail customers of PNWS.

Customer Classification

The existing customer classes are used for cost of service allocation and rate setting:

- Residential Unmetered
- Industrial, Commercial, Institutional (ICI) Unmetered
- Residential Metered (inside boundary)
- ICI Metered (inside boundary)
- Outside Boundary (retail)
- Bulk (PNWS).

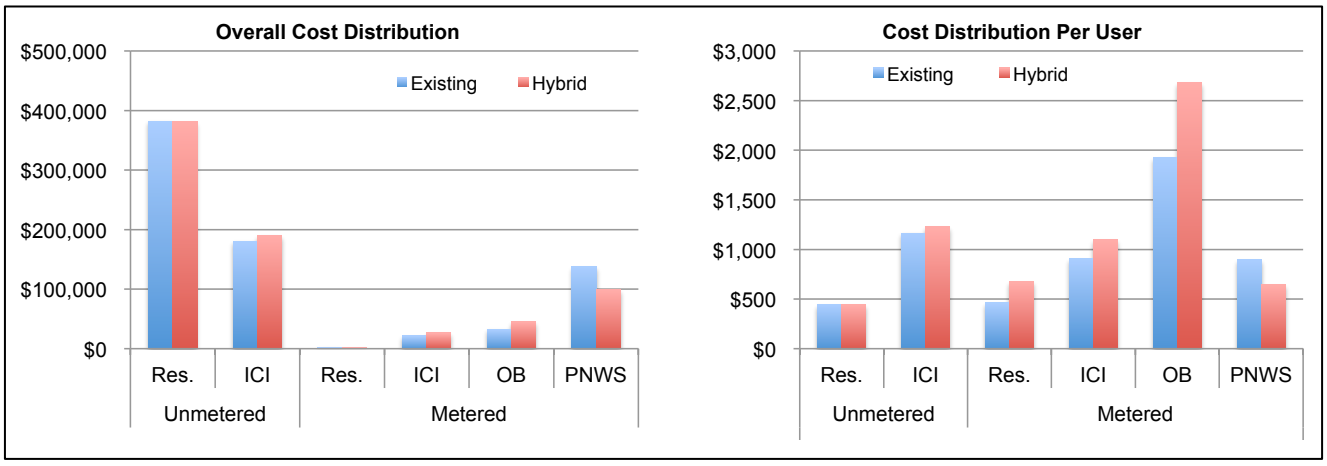
The levels of service typically required by, and provided to, each customer class were qualitatively identified.

Cost of Service Analysis

KWL conducted a cost of service analysis based on the Commodity-Demand Method as described in *Principles of Water Rates, Fees and Charges – Manual of Water Supply Practices M1* (AWWA M1), published by the American Water Works Association. The rate making process is a sequence of three analytical steps: Revenue Requirement Analysis, Cost of Service Analysis and Rate Design.

The revenue requirement to be covered through rates (including frontage taxes) is $746,000 based on the 2013 budget for the VoP Water Service. The revenue requirement was allocated to functional cost components (direct fire protection, commodity, demand and customer costs) using available budget detail and operational information, and in accordance with AWWA M1. Functional costs were then distributed to each customer class based on the service connections (accounts), and estimates of average connection sizes and annual average and maximum day demands for each class.

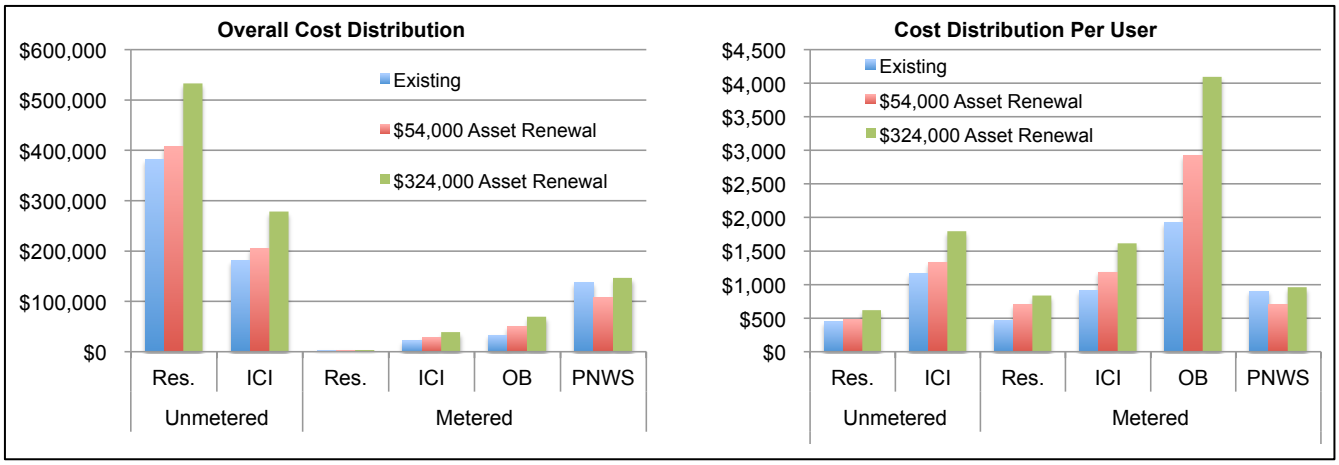
To recognize the different risks associated with customers inside and outside the municipal boundaries, an adjustment to the cost of service distribution was calculated using the Hybrid Approach described in AWWA M1. Based on this approach a total of adjustment of approximately $11,000 per year was applied to the outside boundary retail and bulk customer classes using a hypothetical rate of return on infrastructure of 3% per annum. The cost distribution derived through the analysis is illustrated in the following figure for comparison with the existing cost distribution.



Four water rate structure scenarios were developed for comparison with the status quo. It is anticipated that further refinement of one or more of these structures will be required with input from VoP and stakeholders to determine an appropriate structure for implementation.

Asset Renewal

VoP does not currently budget for replacement of aging infrastructure. Although an asset replacement plan and long-term financial plan are beyond the scope of this study, an estimate from the 2008 Water Rate Study Report was adjusted and inflated to obtain a current estimated asset renewal cost of $324,000. The implications on rates of phased introduction of an asset renewal budget were then examined. Assuming a six-year phased implementation period to achieve sustainable infrastructure renewal funding, revenue would have to increase about $54,000 per year. A water rate scenario was developed to show the impacts of a $54,000 budget per year increase, and a total $354,000 increase. The general implications of budgeting for asset renewal are shown in the following figure.



Recommendations

Based on this review, the following actions are recommended:

1. Distribute the budgeted water user charge revenues among the six existing general customer classes in the following proportions (Hybrid Approach):

Residential Unmetered	51.0%
ICI Unmetered	26%
Residential Metered	0.3%
ICI Metered	3.6%
Outside Boundary - Retail	6.1%
Bulk (PNWS)	13%

2. Establish a budget for asset renewal. A long-term reinvestment strategy should be based on a detailed inventory and condition assessment of assets and stakeholder and public input on acceptable service levels; however, incremental budget increases in the order of $50,000 could be made annually in the interim to begin a gradual transition to a sustainable cost of service.
3. Seek consent of SLRD to provide ongoing water service to retail and bulk customers within its jurisdiction, including the PNWS, and negotiate terms of service including a fair return on the investment for related infrastructure.
4. Prepare an implementation plan for changes to water rates, including a detailed analysis of customer impacts, public and stakeholder engagement, and a phasing strategy.

1. Background

The Village of Pemberton (VoP) has grown rapidly in recent years (its population approximately doubling between 1997 and 2009), and VoP staff report that the capacity of its water supply infrastructure is under stress. The total cost of water service (taxes and user charges) increased from $510,000 in 2006 to $604,000 in 2012. The VoP water system is shown in Figure 1-1.

VoP provides bulk drinking water supply service to the Squamish Lillooet Regional District's (SLRD) Pemberton North Water Service (PNWS) area. The wholesale water rate (and the underlying calculation of cost of service sharing between the VoP retail water customers and its wholesale connections) has been disputed by SLRD since the current rate was set at $1.04/m^3 following a 2008 *Water Rate Study Report* by EarthTech (Canada) Inc (EarthTech, 2008). Although VoP invoices SLRD for wholesale water service at $1.04/m^3, SLRD has continued to pay the 2008 bylaw rate of $0.52/m^3. VoP notified SLRD in December 2012 that water service to the PNWS Area might be discontinued if an agreement to resolve the dispute cannot be reached by December 31, 2013.

1.1 Assignment

VoP retained Kerr Wood Leidal Associates in January 2013 to conduct a review of its water rate structure, with particular focus on the allocation of costs of service to PNWS and other customers outside the municipal boundary.

1.2 Principles & Objectives for Rate Design

For the purpose of this review, the following principles and objectives are assumed:

- **User pay equity –** Customers in each distinct class should pay their fair share of the costs of the services they require and receive. Water service levels are related to commodity usage (annual total use), maximum demands (capacity share), fire protection level, and retail customer service. Customer classes should be defined based on similar service levels.
- **Full cost pricing –** The full cost of sustainable water service, including renewal of aging infrastructure, should be recovered through fees and charges for the service.
- **Water conservation –** Rates should promote prudent use of the Village's limited water resources, ensuring sufficient water is available for all primary needs and deferring projects that increase water supply capacity until they are needed.
- **Stable revenue –** Rates should reliably cover the essential costs of providing water service in each year. Revenue fluctuations due to changes in consumption (e.g. weather) should be accommodated through appropriate contingencies or reserve funding mechanisms.
- **Transparency –** The basis for calculating water taxes, fees and charges should be accessible to, and understandable by, the public, and all assumptions should be clearly stated.

1.3 Terminology

The following definitions apply to terms used in this review:

Annual average demand (AAD) – the average water demand in a calendar year.

Base demand – The average rate of water use in winter months (typically October-March). For example, if water use averages 1 m^3/day between October and March, the base demand is 1 m^3/day, or 365 m^3/year.

Bulk customer – a customer having a water service connection for the purpose of further distribution and sale of water service to multiple parcels of land.

Capital cost – an expenditure that results in the acquisition or addition of tangible capital assets.

Cash needs basis – the method of establishing the revenue requirement based on annual operating expenses, debt service costs, cash funded capital improvements, and reserve contributions.

Commodity costs – costs that vary with the quantity of water produced, including chemicals and most electricity costs.

Commodity-demand method – the cost allocation method in which the annual cost of service is allocated to the commodity, demand, customer and direct fire protection functional cost components.

Customer class – a group of customers with generally similar characteristics in terms of water demand and other required service levels. Classes typically include residential, industrial/commercial/institutional (ICI) and bulk (wholesale), and may include several subdivisions.

Customer costs – costs directly associated with serving customers, regardless of the amount of water used. These costs typically include meter reading, billing, and capital and maintenance costs of providing service connections and retail meters.

Debt service costs – the full annual cost of payments against principal and interest, and annual debt reserve costs and issuance expenses.

Demand costs – costs associated with providing facilities to meet peak demands, including capital, operating and maintenance expenses.

Depreciation – the annual consumption of a tangible capital asset through wear and tear in providing normal service. Water utility assets are typically depreciated on a straight line, meaning that the original cost of the asset is depreciated in equal annual amounts over its useful life.

Direct fire protection costs – Capital, operation and maintenance costs related to providing fire hydrant service only.

Maximum day demand (MDD) - the utility's supply rate during the highest 24-hour day in a year, typically occurring mid-summer for municipal service areas.

Peak hour demand (PHD) – the utility's supply rate during the highest demand hour in a year.

Peaking factor – the ratio of a peak hour demand (PHD) to annual average demand (AAD).

Rate base – the present value of the utility's assets, used in calculating a return on investment for setting rates on a utility basis.

Residential connection equivalent – a multiplier assigned to a customer connection larger than a residential connection to account for differences in costs of providing the service connection.

Retail customer – A customer having a water service connection for use on a single parcel of land, and not for the purpose of further distribution and resale to retail customers on multiple parcels.

Return on rate base – the annual percentage rate of earnings on the rate base.

Revenue requirement – the total annual revenue require to meet all operating and administration expenses and capital requirements of the utility.

Seasonal demand – the difference between annual average demand (AAD) and base demand, typically a large fraction of AAD for connections or customer classes dominated by irrigation usage.

Service connection – the portion of a service line from the utility's watermain to and including the curb stop at the customer's property line. For the purpose of this Review, it also includes the retail water meter.

Tangible capital assets (TCA) – non-financial assets that have physical substance held for use in the production or supply of goods and services, that have useful economic lives extending beyond an accounting period, used on a continuing basis, and not for resale in the ordinary course of operations. For water utilities, TCA include source structures, treatment plants, pumps, watermains, services, hydrants and control systems.

Utility basis – the method of establishing the revenue requirement based on annual operating expenses, depreciation expense, and return on the rate base.

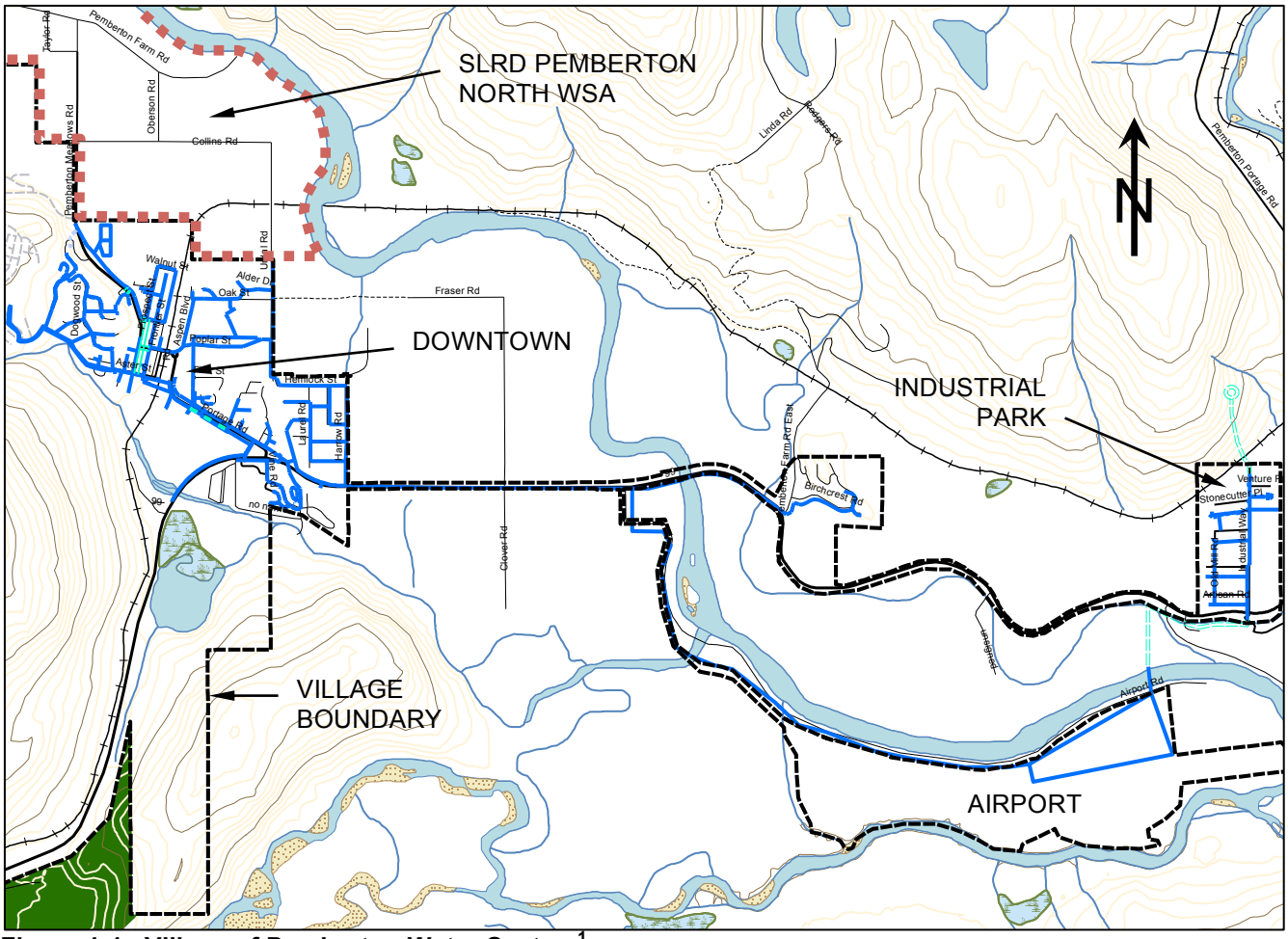


Figure 1-1. Village of Pemberton Water System[1]

[1] Village of Pemberton Official Community Plan 2012

2. Information Review

The background documents and data used for the water rate review are described in the following sections. References are listed in Attachment 1.

2.1 Water Utility Information

Water Supply & Distribution Infrastructure

The VoP water system consists of the following components:

- Three water supply wells (#1-#3), yielding 982 m^3/day, 453 m^3/day and 4,320 m^3/day respectively. Well water is chlorinated at the sources.
- One distribution storage tank, 1,637 m^3
- One pressure reducing valve (PRV) station
- Approximately 24 km of watermains, 150-300mm ø
- Approximately 300 line valves
- 95 fire hydrants
- 996 unmetered customer service connections
- 5 distribution zone meters
- 64 metered customer service connections
- 1 SCADA (control and monitoring) system and 30 flow data loggers.

The VoP water system supplies water to two general areas within municipal boundaries: The downtown core and the airport. Water is supplied to individually metered service connections in the Industrial Park area from Lil'wat First Nation water system, which is not interconnected with the VoP water system. Water is supplied outside the municipal boundary to 17 metered retail customers, and to the metered bulk water service connection for the PNWS.

Water Supply & Demand

Daily water supply flows and quarterly metered water demand records for the years 2010-2012 were provided by VoP. The data were used to develop an estimated 2012 water balance for the VoP water system (Attachment 2). Daily water supply flows are shown in Figure 2-1. An increasing trend in base water demand in 2012 may indicate a significant increase in leakage losses, which may influence the calculated peaking factor for that year. An average of 2010-2012 data was used to estimate retail peaking factors.

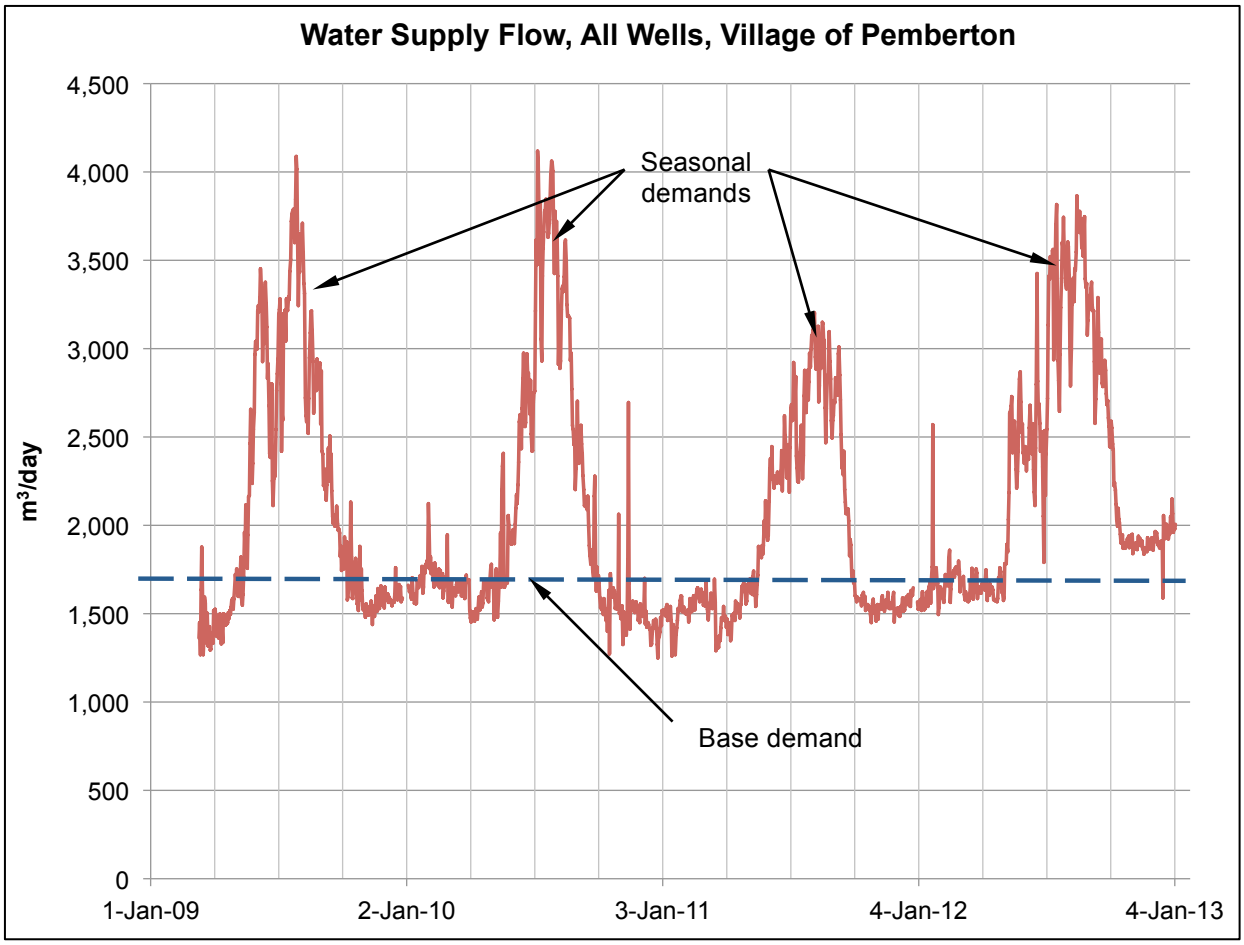


Figure 2-1. Daily Water Supply Flows

Metered retail demands in 2012 were used to construct an estimated water balance for the VoP water system. The water balance was used as a basis for estimating unmetered demands. Assumed annual average and base demands for the unmetered residential and ICI customer classes were checked for reasonableness by calculating the resulting difference between total supply flow and total retail demand (non-revenue water). It is assumed that:

- The average household size in all residential categories is 2.41 people per connection[2]
- Unmetered residential demands are equivalent to the average metered residential demand per connection inside boundary: Annual average demand of 405 litres per capita per day (L/cap/d), and base demand of 291 L/cap/d.
- Unmetered ICI demands on average are 50% of the metered average per connection (i.e., metered ICI connections tend to be the largest connections). Unmetered ICI demands are also

[2] Population / occupied private dwellings, 2011 census for Village of Pemberton, BC Stats

assumed to be 30% seasonal, whereas actual metered demands in 2012 were 61% seasonal (ICI demands are typically less seasonal than residential demands on average, and 61% is unusually high for an ICI average).

Using these assumptions, customer demands (including PNWS bulk water purchases) are calculated to comprise 81% of annual total supply. The remaining 19% is estimated to be non-revenue water, including VoP distribution system leakage, hydrant use and maintenance activities. This is within the expected range for the VoP water system; therefore the assumptions are deemed reasonable.

Metered demands in the Industrial Park area, which are not supplied from the VoP system, were approximately 20,000 m^3 in 2012, or 1,120 m^3 per connection.

Estimated annual total retail demands by customer class are shown in Figure 2-2, and estimated maximum day demands (MDD) are shown in Figure 2-3.

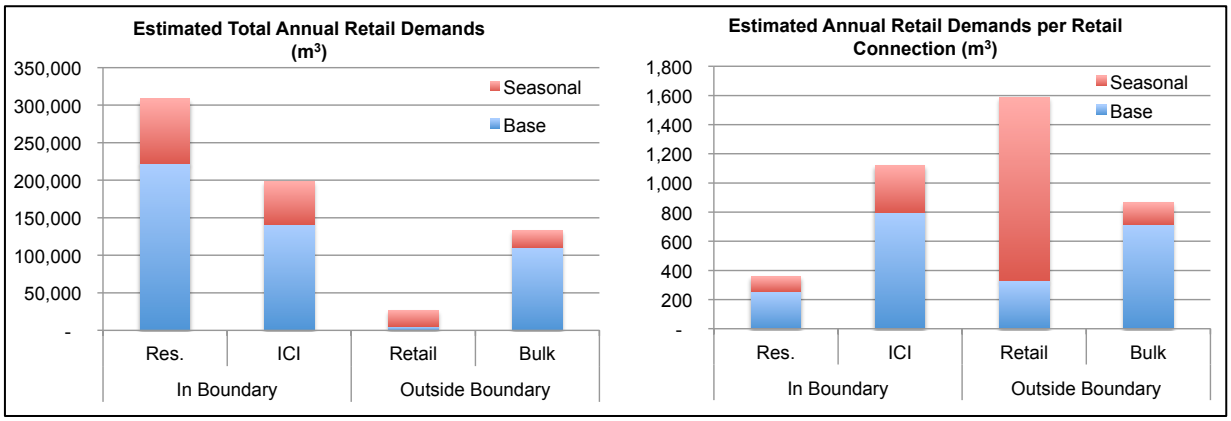


Figure 2-2. Estimated Retail Demands by Customer Class

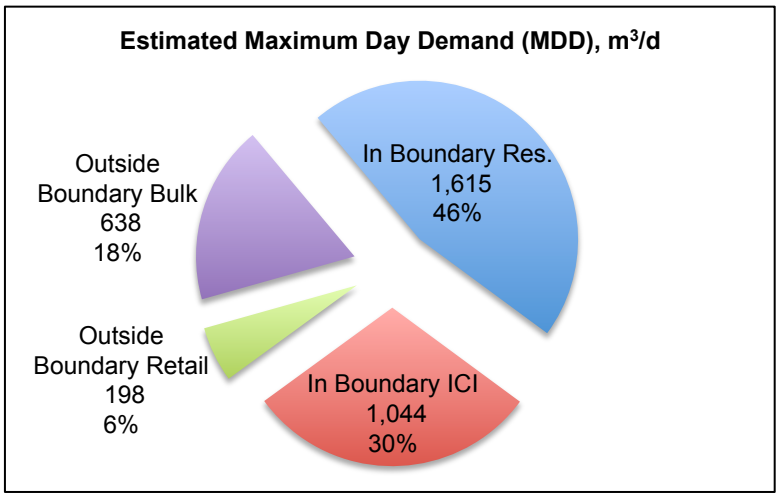


Figure 2-3. Estimated Share of MDD by Customer Class

Budgeting Basis

Water utility revenue is typically budgeted on either a cash needs or utility basis:

- In cash needs budgeting, capital expenses are funded directly through rates, or via transfers to reserve or payment of principal and interest costs on debt. Tangible capital assets (TCA, or infrastructure assets) are accounted separately.
- In utility budgeting, an annual depreciation expense on TCA and a reasonable return on the rate base (the present value of utility's total investment in assets) are used in the calculation of rates in place of payments against principal or cash funding of capital projects. Utility budgeting is well suited to full-cost pricing, but is more complex.

Operation, maintenance and administrative costs are budgeted similarly under both methods. Under either approach, determining the sustainable full cost of service requires an accurate inventory and valuation of TCA, and a long-term asset renewal plan. Under cash needs budgeting, most Canadian utilities have under-recovered depreciation costs over several decades, resulting in a substantial infrastructure deficit (funding shortfall for renewal of aging infrastructure).

VoP uses a cash needs budgeting methodology. Although EarthTech (2008) developed a budget estimate for asset renewal ($211,000 annually, based on 1/80 of the estimated total asset replacement cost in 2008 dollars), VoP assigned no budget between 2010 and 2012 for renewal of aging assets. The provisional 2013 budget includes $30,000 for watermain replacement.

Revenue and Expense

The provisional 2013 water service budget provided by VoP was used as the basis for this rate review, as shown in Table 2-1.

Table 2-1. Water Service Budget Used for Rate Review

GL CODE	DESCRIPTION	2013 BUDGET
REVENUE		
03-40-6100-1325	Water - User Rates	(485,000)
03-40-6100-1326	Water - Frontage Taxes	(89,959)
03-40-6100-1327	Water - Connection Fees	(10,000)
03-40-6100-1329	Water - Penalties	(5,000)
03-40-6100-1333	Water - 0B User Rates	(17,857)
03-40-6100-1334	Water - IP User Rates	(23,000)
03-40-6100-1335	Water - PNID User Rates	(130,000)
03-40-6600-1450	Water - Investment Income	(5,000)
03-40-7200-1671	Grant - Provincial Project - General	(1,200,000)
TOTAL REVENUE		(1,965,816)
EXPENSE		
OPERATION AND MAINTENANCE EXPENSE		
03-40-8000-0000	Water - Administration	325,000
03-40-8000-6006	Water - Insurance	15,000
03-40-8000-6011	Water - Telephone	1,300
03-40-8000-6012	Water - Hydro	45,000
03-40-8000-6018	Water - Purchases	25,000

03-40-8100-6101	Water - Legal	43,000
03-40-8100-6102	Water - Engineering	10,000
03-40-8200-0000	Water - Maintenance	65,000
DEBT AND RESERVE EXPENSE		
03-40-8900-0925	Water - Interest Expense	53,405
03-40-8900-6527	Water - Principal Payment	36,554
RATE FUNDED CAPITAL EXPENSE		
03-40-7201-6504	Project - Capital Expense - Water	1,230,000
TOTAL EXPENSE		1,849,259
NET DEFICIT (SURPLUS)		(116,557)

Based on conversations with VoP staff, an unspent surplus is typically transferred to the general fund at year-end as a contribution toward general administration and governance costs that are not otherwise budgeted in the Water Fund, but are legitimate costs of providing water service. For the purpose of this review, the net surplus amount is added to the general overhead expense (included in 03-40-8000-0000 - Water-Administration) in order to balance the 2013 provisional budget revenue requirement against water utility costs. Treating the budgeted surplus as an overhead expense in this manner is consistent with the full-cost pricing principle, provided that the funds are needed to cover general overhead costs attributable to the water service.

Tangible Capital Assets

Earth Tech (2008) estimated the replacement cost of the VoP water system by major component. For this review, the quantities and unit costs have been adjusted for additions to the water system since 2008, and for inflation.

Table 2-2. Village of Pemberton Water System – Asset Replacement Costs

Asset Description	Estimated Replacement Cost	Useful Life (years)[3]	Annualized Replacement Cost
Service Connections	$1,576,000	40	$39,000
Zone Meters (5)	$50,000	20	$3,000
Customer Meters (64; various sizes)	$742,000	20	$37,000
Fire Hydrants (95)	$580,000	40	$15,000
Pressure Regulating Station (1)	$80,000	40	$2,000
Valves (300)	$353,000	40	$9,000
Mains (24,500 m)	$11,676,000	80	$146,000
Groundwater Wells (3)	$1,934,000	60	$32,000
SCADA and flow data loggers	$100,000	10	$10,000
Reservoir (1)	$1,071,000	35	$31,000
TOTAL	$18,162,000	41	$324,000

[3] *Guide to the Amortization of Tangible Capital Assets*. Local Government Infrastructure and Finance Division, BC Ministry of Community Services. 2008. Useful lives for all asset classes except meters are taken from this document. For meters, the *Guide* specifies a useful life of 5 years, which is unreasonably short for coastal BC communities. A useful life of 20 years is recommended for all meters based on KWL experience, as a conservative estimate of the service life of a mechanical water meter, reading with acceptable precision.

Planning and Financial Forecasting

The provisional 2013 budget includes two capital projects:

- New reservoir $1,200,000
- Downtown metering $30,000

The reservoir project is required to increase storage capacity for peak demand balancing, emergency and firefighting purposes, and is therefore not asset renewal work. The metering project is also not asset renewal work.

Other capital projects not currently budgeted, but planned for the medium term, include universal customer metering and interconnection across the Lillooet River between the airport and Industrial Park areas. While these projects would significantly improve the operability and resiliency of the system, these projects are categorized as capacity improvements rather than asset renewal.

An asset renewal plan and financial forecast is beyond the scope of this review, but is planned as a separate assignment for 2013. EarthTech (2008) assumed the asset renewal cost to be 1/80 of the total asset replacement value. Watermains, which represent more than half of the overall asset replacement cost, may have a useful life greater than 80 years; however, most assets will require replacement more frequently. Based on the useful lives of the asset groups listed in Table 2-2, the aggregate useful life of the VoP water system assets is approximately 41 years, and the total annualized cost of sustainable asset renewal is estimated to be $324,000.

Although some assets are likely to have longer useful lives than the estimates used here, several of the existing assets are currently nearing the end of their useful lives and the short- to medium-term term requirement for annual infrastructure renewal funding will likely exceed $324,000. The VoP 2013 provisional water service budget used in this review includes no funding for asset renewal..

2.2 Previous Rate Design Work

No information was available regarding rate design work prior to 2007 for VoP. In 2007, VoP commissioned EarthTech (Canada) Inc. to prepare a business case for universal water metering. As an outcome of the metering study, VoP retained EarthTech to conduct a detailed water rate review and recommend a rate structure to achieve the following objectives:

- Full cost recovery
- Incentive to conserve water
- User pay equity
- Incentive for boundary restructuring (users outside municipal boundaries are “subject to a rate structure that will encourage them to support a restructuring of the boundaries”)
- Support for agricultural uses within the Village.

The 2008 EarthTech study was future-focused, including a forecast estimate of the sustainable full cost of water service. A full-cost estimate of $751,000 per annum for the water service included the costs of several future capital projects for system expansion and upgrades, and contributions to an asset replacement reserve. At the time, VoP was recovering $435,000 per annum on user charges, covering only the operation, maintenance and administration (OM&A) costs.

EarthTech appears to have considered only total annual water consumption (commodity cost) in apportioning water service costs among customer classes. It is not evident that costs of service connections, peak capacity or fire protection were calculated or apportioned out among customer classes. Citing a lack of available water usage data to support cost allocation among retail customer classes, Earth Tech provided only an analysis of bulk (PNWS) versus retail costs. A PNWS bulk water rate was calculated based on the estimate that PNWS was "consuming approximately 15% of the available capacity" of the VoP water system[4]. The full-cost estimate was prorated for PNWS on this basis, excluding components of capital project costs and asset renewal deemed unrelated to provision of drinking water to the PNWS area. EarthTech recommended a PNWS bulk rate of $0.95/m^3 and a retail rate of $0.62/m^3 for VoP customers.

2.3 Pemberton North Water Service

KWL interviewed SLRD staff on February 20, 2013 to obtain information for this review, and to gain an understanding of SLRD perspectives for a successful rate review process. PNWS became a SLRD water local service area when the province dissolved the Pemberton North Improvement District (PNID) in 1990. Reportedly, much of the infrastructure inherited by SLRD was poorly constructed, in poor condition and operating inefficiently (e.g., significant distribution system leakage). SLRD has completed several upgrades to the system, and bulk water flows appear to have decreased in the past three years. However, although seasonal demand has decreased, base demand appears to have remained roughly constant (Figure 2-4). This pattern suggests that while seasonal water uses such as irrigation may have decreased, leakage losses may not have significantly changed in the past three years.

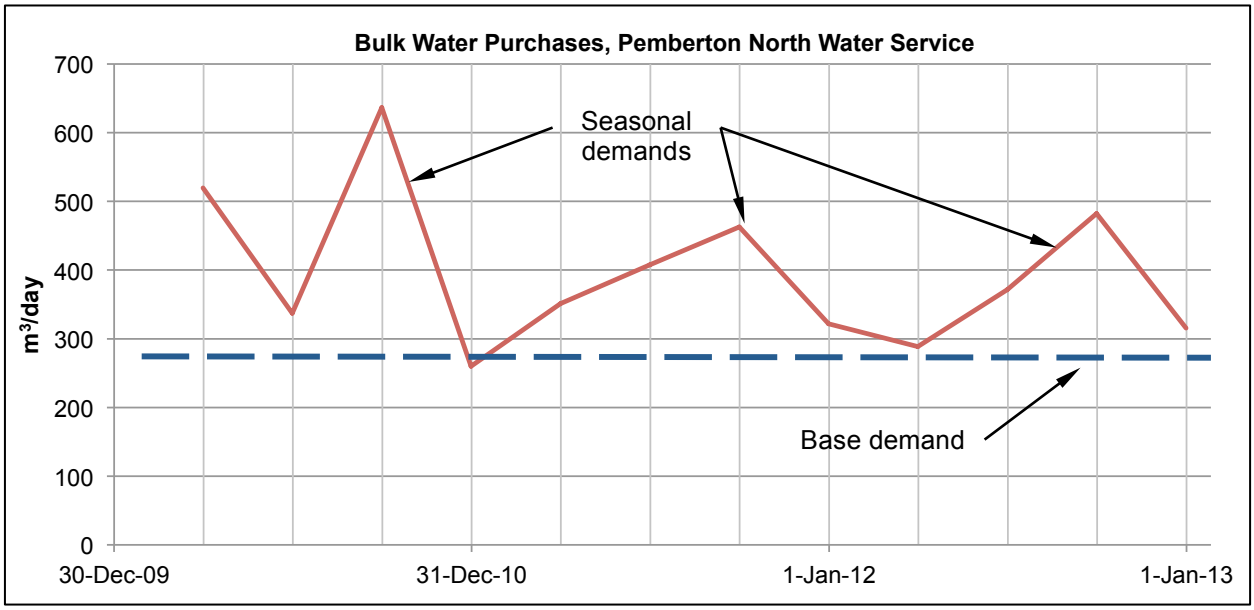


Figure 2-4. PNWS Bulk Water Purchases 2010-2012

[4] EarthTech, 2008; p. 23.

SLRD staff provided the following information about the PNWS.

Characteristics of the PNWS

- PNWS serves 116 parcels, including 112 in the service area and 4 parcels within VoP boundary
- 154 retail connections, all unmetered (includes 31-unit mobile home park)
- Connected land uses:
  - Mostly rural residential
  - SLRD works yard – 25mm service
  - Automotive shop (home business) – 25mm
  - Bed and breakfast – 25mm
  - Nursery, approx. 1 acre, cut flowers – 25mm
  - Hobby farms – residential water service (some water may also be used for non-residential purposes)
  - High school (disconnected) – 2 x 50mm
- Fire protection: distribution hydrants, and 4 buildings with sprinklers
- Reportedly significant distribution system losses in previous years; recent watermain replacement was aimed at reducing losses
- 2012 base water demand was 716 m^3 per connection (including PNWS distribution losses), roughly three times the metered residential average in VoP;
- 2012 seasonal demand was 148 m^3 per connection, roughly equal to the metered residential average in VoP.

Costs, Fees and Charges

- Parcel tax $995; properties in VoP are billed the equivalent
- Single-Family Residential user charge $324 per connection (including $0.52/$m^3$ bulk water cost), was increased by 50% in October 2012[5]
- Average cost per connected residential parcel (parcel tax and user charge) is $1,319/year
- At $1.04/$m^3$ bulk rate, average cost would be $1,779/year
- $67,000 annual debt servicing cost for 2003 upgrades (roughly $600 per parcel)
- 2010-11 upgrades were funded by Gas Tax grant and reserves
- $62,755 current balance in capital reserve fund.

Future Considerations

- Most buildable lots have been fully subdivided; minimal capacity for infill development
- Perhaps 5-10 lots that could be subdivided in the future, at an average rate of 1 lot per year
- Most of the PNWS area is in the Agricultural Land Reserve (ALR)

[5] Effective April 1, 2013, SLRD raised PNWS user charges by 111%, bringing the Single-Family Residential charge to $684 and the total annual cost per connected residential parcel to $1,679.

- SLRD retail metering for PNWS is under consideration, particularly if VoP retail metering goes forward.

In this review, KWL has attempted to assist VoP and SLRD in reaching a successful resolution to the current rate dispute. This includes providing clear rationale and analysis for assigning costs of service that are attributable to PNWS in the VoP bulk rate, and clear and transparent definition of allocated costs.

3. Customer Classification

3.1 Customer Classes for Review

For this review, the following existing customer classes are used for cost of service allocation and rate setting:

- **Residential Unmetered** – customers within the municipal boundary with residential use only. The four PNWS customers within the municipal boundary are not included in this class.
- **Industrial, Commercial, Institutional (ICI) Unmetered** – customers within the municipal boundary with non-residential uses (may also include mixed residential/commercial use).
- **Residential Metered (inside boundary)** – customers with a metered single-family residential service connection (assume 19mm standard residential water meter). For simplicity, each connection is assumed to represent a single dwelling, although some may have accessory dwellings.
- **ICI Metered (inside boundary)** – customers with a metered service connection for non-residential uses (may also include mixed residential/commercial use). The average water meter size is assumed to be 50mm for this class. This class is also assumed to include every parcel in the Industrial Park with a water service connection.
- **Outside Boundary (retail)** – metered connections to individual parcels of land outside the VoP boundary. May be residential or ICI.
- **Bulk** – metered connections to a water distribution system serving multiple parcels of land. PNWS is the only bulk connection to the VoP water system. Although the PNWS water service area is outside the VoP boundary, four parcels within the VoP boundary receive water service from PNWS and are therefore included in this class.

There are several subdivisions within the unmetered classes as set out in *Pemberton Water Rates Bylaw No. 664, 2011* (as amended by Bylaw No. 702, 2012). For this review, it is assumed that those subdivisions of the existing 'domestic' and 'commercial' classes will continue under any adjusted structure, and will be proportionally adjusted within the class (e.g., if a 10% increase is recommended for a particular class, all current charges within that class will be increased by 10%). Further classification based on similar water use patterns or required service levels was not possible for this review due to data limitations.

3.2 Service Levels

Municipal water systems provide a variety of services to the municipality and its customers, typically including:

- Safe and aesthetically satisfactory drinking water
- An acceptable range of service pressures
- An acceptable quantity of water to meet overall annual needs
- Flow capacity to meet peak demands
- Water supply for fighting building fires
- Water for municipal needs such as street cleaning, public pools and water system flushing
- Reliability or continuity of service in adverse conditions (power outages, floods, droughts, earthquakes).

Each of these services may be provided at varying levels, and costs of service typically increase correspondingly with an increase in a level of service. Minimum service levels are legislated in some cases (e.g., provision of water that is safe to drink). Figure 3-1 illustrates the relative levels of service provided to each customer class.

Service \ Customer Class	Residential Unmetered	ICI Unmetered	Residential Metered	ICI Metered (in VoP)*	Outside Boundary	Bulk (PNWS)	Notes
Safe and aesthetically satisfactory drinking water							Generally most important for residential users
An acceptable range of service pressures							
Sufficient water quantity for annual demands							Intensity of use of VoP capacity per account
Flow capacity for peak demands							Intensity of use of VoP capacity per account
Water supply for fire protection							Most protection downtown, least outside VoP
Reliability/continuity of of service							Reliability decreases further from downtown

Level of Service Required and Provided
(intensity or share of total use)

- Service not provided
- Low service level and/or light demand
- Moderate service level available and/or required
- High service level provided and/or heavy demand

* Most metered ICI customers are in the Industrial Park, which does not have VoP as its water source. Therefore they do not benefit from several of the service levels provided by the VoP system. Service levels provided by Lil'wat FN are outside VoP control.

Figure 3-1. VoP Customer Class and Service Level Relationships

4. Cost of Service Analysis

EarthTech (2008) used *Infraguide – Water and Sewer Rates: Full Cost Recovery* (2006) as a basis for recommending water rates. Although this guide addresses the principles of full cost pricing, it does not address the principles or methodology for establishing customer classes and allocating costs among them based on service levels provided or required. The authoritative standard for development of water utility rates in North America is *Principles of Water Rates, Fees and Charges – Manual of Water Supply Practices M1* (AWWA M1), published by the American Water Works Association.

The methodology used in this review is based on the Commodity-Demand Method as described in AWWA M1. The rate making process is a sequence of three analytical steps: Revenue Requirement Analysis, Cost of Service Analysis and Rate Design. The detail of the analysis described in this section is provided in Attachment 3.

For readability in this report, financial figures are generally rounded up or down to the nearest $1,000.

4.1 Revenue Requirement

The revenue requirement is simply the level of funding required to operate the utility. As discussed in Section 2.1, the two principal methods used to determine revenue requirement are the cash needs and utility methods. Since VoP uses the cash needs approach for budgeting, this approach is also used as a basis for establishing the revenue requirement for this analysis, to simplify comparison with the existing rate structure. The revenue requirement is derived from the budget data presented in Table 2.1.

Operating Expense

The operating and administration expense consists of all costs incurred in the annual operation of the utility, including direct and overhead costs. As discussed in Section 2.1, the budget surplus is also assumed for this review to be an operating expense, due to the typical practice of transferring the surplus at year-end to the general fund to cover general administration costs that are not otherwise recovered from the utility. The 2013 total operating and administration expense is $646,000.

Capital Related Expense

Under the cash needs basis, the capital related expense includes the annualized costs of capital expenditures including direct project funding during the budget year, transfers to capital reserve funds for future works, and principal and interest costs on loans for capital projects. The 2013 total capital related expense is $1,320,000, including $1,200,000 for a proposed new reservoir.

Rate Revenue Requirement

To determine the requirement for revenue from annual fees and charges (and taxes specific to water service), non-rate revenues are subtracted from the sum of operating and capital costs. Non-rate revenue includes connection charges, development cost charges, penalties, investment income, grants and miscellaneous other revenues. The 2013 non-rate revenue is $1,220,000, including a $1,200,000 provincial grant for the proposed new reservoir. The resulting revenue requirement from rates is:

Operating Expense	$646,000
Capital Related Expense	$1,326,000
Non-Rate Revenue	($1,220,000)
Rate Revenue Requirement	$746,000

The revenue requirement of $746,000 is based on the operating and capital costs currently budgeted, and does not include the funding for renewal of tangible capital assets, estimated to be $324,000 annually (see Section 2.1).

4.2 Cost Allocation

Cost allocation consists of two steps: assignment of revenue requirements to functional cost components; and distribution of costs among customer classes. Cost allocations may subsequently be adjusted for several specific purposes. Specifically relevant to this review, public utilities commonly make adjustments for customers outside municipal boundaries to reflect differing levels of risk associated with ownership of the infrastructure assets. These issues are addressed in Section 4.3.

Allocation by Cost Component

Under the Commodity-Demand method, each element of operating and capital expense, and non-rate revenue, is divided into one or more of the following functional cost categories:

- **Direct fire protection costs** – costs associated only with providing water supply for fire protection. Typically this includes the full cost to install, operate and maintain fire hydrants, and valves and branch mains required to supply hydrants only.
- **Commodity costs** – costs that tend to vary with the quantity of water produced, regardless of the rate of production. These typically include a large share of water supply, treatment and water quality monitoring costs, and a smaller share in distribution costs (watermains are required to distribute water as a commodity, regardless of the rate of use). These costs are generally associated with annual total or average demands.
- **Demand costs** – costs that are required to deliver peak demands (e.g., maximum day and peak hour). These typically include a moderate share of supply and treatment costs, and a large share of distribution and storage costs. Since peak hour demand data is not available for the VoP system, demand costs are apportioned based on estimated maximum day demands (MDD). Costs associated with providing fire flows through supply and distribution systems are also included in this category.
- **Customer costs** – costs specific to the provision of customer connections and service that do not vary with water usage. Maintaining and renewing service connections and meters, meter reading, billing and customer service are attributed entirely to this category.

Limited information was available to determine the functional components of operating costs for VoP. The 2012 actual cost detail for maintenance expense, and a general description of operation and maintenance activities, was used to develop estimated functional cost ratios for direct costs (Table 4-1).

Table 4-1. Functional Cost Ratios Used for Allocating Direct Costs

Expense Item	Fire Protection	Commodity	Demand	Customer	Note
Telephone		50%	50%		SCADA lines
Hydro		50%	50%		Pumping costs
Purchases	30%	20%	30%	20%	Based on maintenance detail
Engineering	30%	20%	30%	20%	Based on maintenance detail
Maintenance	30%	20%	30%	20%	Purchased materials and services identified by asset type

Operating overhead costs (Administration, Transfer to General, Insurance and Legal) were allocated in proportion to the subtotals of direct costs, excluding the costs of chemicals and electricity (per AWWA M1 – rationale is that overheads are independent of energy and chemical usage).

Capital costs were allocated to commodity and demand functions based on the asset types constructed. Non-rate revenues were similarly allocated, and were subtracted from the subtotal of capital and operating costs. The resulting functional allocation of revenue requirement is summarized in Table 4-2.

Table 4-2. Functional Cost Allocation Summary

Revenue/Expense Item	Fire Protection	Commodity	Demand	Customer	Total
Operating and Admin Expense	167,000	156,000	211,000	112,000	646,000
Capital and Reserve Expense	0	45,000	1,275,000	0	1,320,000
Total Expense	**167,000**	**201,000**	**1,486,000**	**112,000**	**1,966,000**
Non-Rate Revenue					
Connection Fees				(10,000)	(10,000)
Penalties				(5,000)	(5,000)
Investment Income				(5,000)	(5,000)
Grants – Capital Projects			**(1,200,000)**		(1,200,000)
Total Cost to be Recovered	**167,000**	**201,000**	**286,000**	**92,000**	**746,000**
Allocations - Percent of Total	22%	27%	38%	12%	100%

Distribution to Customer Classes

To allocate costs equitably by customer class, functional costs are distributed based on units of service as follows:

- **Direct fire protection costs** – distributed based on number of connections within the VoP boundary in each category. The rationale is that hydrants are distributed throughout the system in roughly the same proportions as service connections, and are generally not available for OB and PNWS customers.
- **Commodity costs** – distributed in proportion to total annual water demand.
- **Demand costs** – distributed in proportion to estimated share of maximum day demand (MDD). MDD is estimated based on total annual demand and the ratio of seasonal to total demand.
- **Customer costs** – distributed based on residential connection equivalents using assumed average connection sizes, where a residential or OB retail connection = 1 (19mm), an ICI connection = 6 (50mm), and bulk (PNWS) = 20 (150mm). These factors are based on service connection capacity and life cycle cost of the connection infrastructure (construction and maintenance of laterals and meters). Capacity and cost of a water service connection increase approximately in proportion to the square of the pipe diameter.

The units of service and resulting cost distribution among customer classes are provided in Tables 4-3. And 4-4.

Table 4-3. Units of Service Used for Cost Distribution

Component	Total	Allocation by Customer Class					
		Unmetered		Metered			
		Res.	ICI	Res.	ICI	OB	PNWS
Commodity (m^3)	662,000	306,000	174,000	2,000	20,000	27,000	133,000
Maximum Day (m^3)	3,710	1,590	900	10	130	420	660
Connections	1,062	859	155	6	24	17	1
Res. Conn. Equivalent	1,976	859	930	6	144	17	20

Table 4-4. Cost Distribution by Customer Class

Component	Total	Allocation by Customer Class					
		Unmetered		Metered			
		Res.	ICI	Res.	ICI	OB	PNWS
Fire Protection Costs	$167,000	$138,000	$25,000	$900	$4,000	$0	$0
Commodity Costs	$201,000	$93,000	$53,000	$600	$6,000	$8,000	$40,000
Demand Costs	$286,000	$123,000	$69,000	$800	$10,000	$32,000	$51,000
Customer Costs	$92,000	$40,000	$43,000	$300	$7,000	$800	$900
Total Cost	**$746,000**	**$393,000**	**$190,000**	**$2,600**	**$27,000**	**$41,000**	**$92,000**
Average per Account		**$457**	**$1,227**	**$436**	**$1,109**	**$2,434**	**$92,000**
Existing Rates – Total	$758,000	$382,000	$181,000	$2,800	$22,000	$33,000	$138,000
Existing – Per Account		$445	$1,165	$462	$909	$1,927	$138,000

The results of the cost of service analysis are compared with existing allocation of costs in Figure 4-1. For PNWS, the cost of bulk water service for each retail connection to the system is shown in the figure. The existing cost distribution is generally very similar to the calculated distribution.

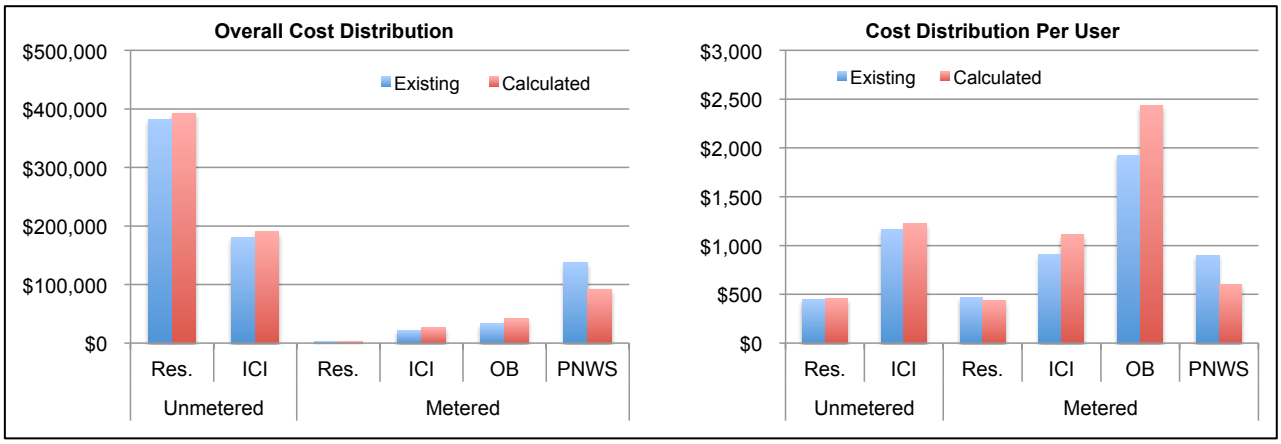


Figure 4-1. Existing and Calculated User Cost Distribution (Unadjusted)

4.3 Adjustment for Service Outside Municipal Boundary

Municipal utility customers within the boundary are also owners of the infrastructure, to whom the municipality bears a responsibility to provide service. As owners, these customers also ultimately bear the full costs and risks associated with the service. Users outside the boundary are strictly customers, and may have opportunities to withdraw from the service and purchase or develop alternative water

services. The owners of the service also are in a position to establish the nature of the relationship with the users outside the boundary.

Benefits

Providing utility services outside the municipal boundary offers potential benefits to the municipality:

- **Economy of scale** – a larger customer base may significantly reduce costs for all users, particularly in a smaller community such as Pemberton;
- **Leveraging available capacity** – Short- to medium-term agreements to provide service outside boundaries can recover municipal costs of capacity in the system developed to meet future needs, thereby avoiding carrying costs to customers in the municipality for unused capacity in the infrastructure;
- **Return on infrastructure investment** – municipalities may receive a reasonable return on the infrastructure used to deliver service outside the boundary, in exchange for bearing the risks of ownership.

The *Community Charter* requires that for a municipality to provide a service outside its boundaries, it must obtain the consent of the local government or First Nation having jurisdiction in the area where the service is provided. In providing consent, the other local government or First Nation may impose conditions including limits on the service, and a process for terminating the service.

Risks

Typical risks associated with providing out of boundary water service include:

- **Business risk** – that a customer cannot meet its financial obligations.
- **Interest rate risk** – uncertainty in borrowing rates on infrastructure investments made for outside boundary service
- **Financial risk** – that the municipality will have insufficient cash flow to meet its financial obligations
- **Liquidity risk** – the commitment of funds to infrastructure for outside boundary services

Business risk is significant for retail customers outside boundary; however, the consequences are relatively small unless an event precipitates concurrent default by several users. Interest rate and liquidity risks are significant for bulk water service; however these risks can be readily mitigated through a long-term agreement in the case of PNWS since both parties are local governments with similar obligations to provide public services. If mutually acceptable terms can be reached with SLRD based on a complete understanding of the fair value of the service VoP provides, the risks to VoP in providing water service outside its boundaries will be small.

Methodology

A utility basis budget is commonly used to determine a fair return on infrastructure investment, and this approach is established by regulation in several jurisdictions where municipalities provide utility services outside their boundaries in the United States. In BC, an acceptable return on infrastructure investment must be determined by agreement between the municipality providing the service and the local government or First Nation having jurisdiction where the service is provided. A fair rate of return may be established by negotiating an appropriate risk premium to apply to a risk-free rate of return such as a long-term government savings bond.

An example calculation for VoP is provided in Appendix D using the Hybrid Approach as described in AWWA M1. Under this approach, revenues for customers outside boundary are calculated on a utility basis budget, and the remainder of the cash-basis revenue requirement is distributed among inside boundary classes. Assuming a rate of return on infrastructure of 3%[6] from outside boundary customers, the resulting cost distribution is shown in Table 4-5 and Figure 4-2.

The adjustment for a return on infrastructure investment from outside boundary customers would recover roughly $10,000 in additional revenue from customers outside the boundary, and corresponding cost savings for users inside the boundary.

Table 4-5. Cost Distribution by Customer Class – Hybrid Approach

Component	Total	Allocation by Customer Class					
		Unmetered		Metered			
		Res.	ICI	Res.	ICI	OB	PNWS
Fire Protection Costs	$135,000	$111,000	$20,000	$800	$3,000	$0	$0
Commodity Costs	$211,000	$99,000	$56,000	$600	$6,000	$8,000	$41,000
Demand Costs	$324,000	$140,000	$79,000	$900	$11,000	$36,000	$57,000
Customer Costs	$76,000	$33,000	$35,000	$300	$5,000	$1,000	$1,000
Total Cost	**$746,000**	**$382,000**	**$190,000**	**$2,600**	**$26,000**	**$45,000**	**$99,000**
Average per Account		**$445**	**$1,229**	**$421**	**$1,102**	**$2,681**	**$99,000**
Existing Rates – Total	$758,000	$382,000	$181,000	$2,800	$22,000	$33,000	$138,000
Existing – Per Account		$445	$1,165	$462	$909	$1,927	$138,000

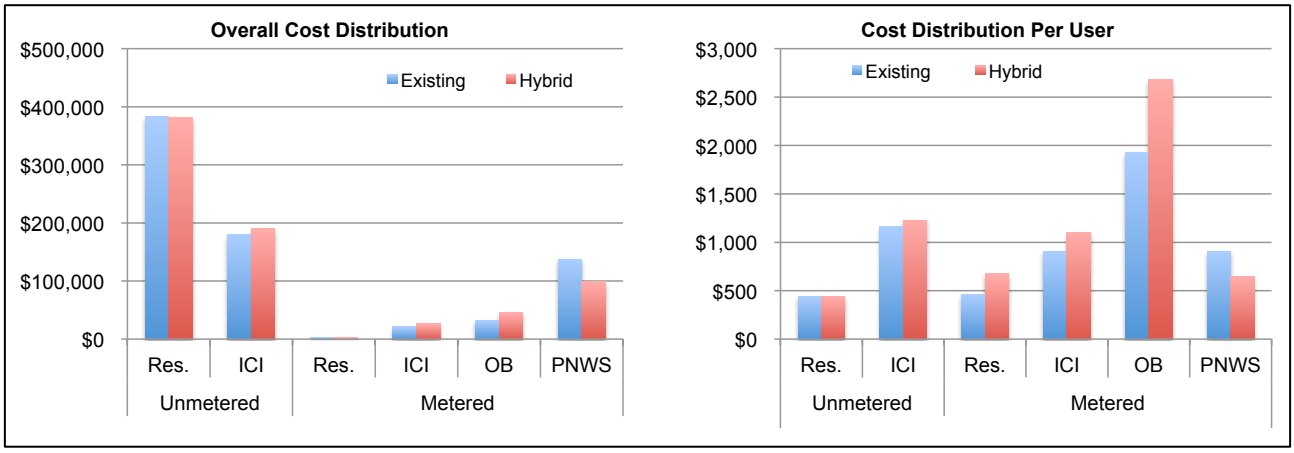


Figure 4-2. Existing and Recommended User Cost Distribution – Hybrid Approach

[6] It is assumed that risks to VoP will be mitigated through a long-term agreement with SLRD that provides reasonable assurance that infrastructure investments will be recouped.

4.4 Rate Structure Alternatives

Although there is a wide range of water rate design alternatives, the high proportion of unmetered service connections limits the options currently available to VoP. For this review, the analysis of alternatives is focused on simplicity and comparability with existing rates, while making substantial progress toward VoP's desired objectives.

For simplicity, the unadjusted cash needs revenue requirements are used in the comparison of alternatives (Table 4-4). Scenarios #1-4 do not include an adjustment for services outside the municipal boundary, and do not recover the costs of infrastructure renewal. Scenario 5 includes an the adjustment described in Section 4.3 for customers outside the municipal boundary, and phased implementation of a $324,000 annual asset renewal budget.

Scenario 1: Existing (2012) Rate Structure

The current VoP water rate structure is summarized in Table 4-6. Most metered customers are charged for consumption only above 300 m^3 every three months. The rates shown are for 2012, although the rate revenue budget for 2012 was only 0.6% less than the 2013 budget.

Table 4-6. Status Quo Rates

Component		Allocation by Customer Class					
		Unmetered		Metered			
		Res.	ICI	Res.	ICI	OB	PNWS
Frontage Tax		$102	$102	$102	$102		
Fixed Annual Charge		$342.99	$1,063.18	$75.96	$486.44	$749.44	$749.44
Tier 1 - 0-300 m^3	per m^3			$0.70	$0.00	$0.00	$0.00
Tier 2 - over 300 m^3	per m^3			$0.70	$0.75	$1.04	$1.04

Scenario 2: Similar Structure to Status Quo

In this scenario, the status quo rate structure is retained and rates are adjusted to meet the calculated revenue requirement for each customer class. The total fixed annual cost is shown as a user charge for simplicity, although a portion of the fixed component may continue to be recovered through a frontage tax. For metered accounts, fixed charges are generally set to recover Customer and Fire Protection costs, while usage charges recover commodity and demand costs.

Table 4-7. Status Quo Rate Structure with Reallocated Costs

Component		Allocation by Customer Class					
		Unmetered		Metered			
		Res.	ICI	Res.	ICI	OB	PNWS
Frontage Tax							
Fixed Annual Charge		$457	$1,227	$207	$738	$546	$927
Tier 1 - 0-300 m^3	per m^3			$0.57	$0.00	$0.00	$0.00
Tier 2 - over 300 m^3	per m^3			$0.57	$0.47	$1.24	$0.69

Scenario 3: Base Charges and Uniform Rates

This structure is a simplification of the status quo structure, and provides a clear and understandable structure to users, and a substantial incentive to conserve water. Eliminating the 'free' 1,200 m^3 of annual consumption provided under the current structure provides an economic incentive to reduce

demands below that threshold, which is very high relative to current BC averages for a residential or small commercial connection.

Table 4-8. Base Charges and Uniform Rates

Component		Allocation by Customer Class					
		Unmetered		Metered			
		Res.	ICI	Res.	ICI	OB	PNWS
Frontage Tax							
Fixed Annual Charge		$457	$1,227	$207	$738	$546	$927
Tier 1	per m^3			$0.57	$0.44	$1.19	$0.69

Scenario 4: Inclining Block Rates

Inclining block, (or tiered) rate structures provide the strongest financial incentive to conserve water, and the tier thresholds can function as water budgets if the marginal cost in the next tier is substantially greater. These structures can be more difficult for customers to understand and require rigorous public communication and a phasing-in strategy for successful implementation. Revenues can also fluctuate unpredictably due to weather.

For this analysis, commodity costs are generally recovered in the first rate block, and demand costs are recovered in the second block. The third block would be set well above the average summer demand in each class, and would serve as a strong financial incentive to avoid excessive use. No revenue would be budgeted in this rate block.

Table 4-9. Inclining Block Rate Structure

Component		Allocation by Customer Class					
		Unmetered		Metered			
		Res.	ICI	Res.	ICI	OB	PNWS
Frontage Tax							
Fixed Annual Charge		$457	$1,227	$207	$438	$346	$927
Tier 1	per m^3			$0.34	$0.52	$0.94	$0.37
Tier 2	per m^3			$0.35	$1.11	$2.06	$2.24
Tier 3	per m^3			$0.71	$2.22	$4.11	$4.47

Scenario 5: Hybrid Approach with Phased Asset Renewal Budgeting

This scenario is similar to Scenario 2, with the following adjustments:

- Cost of service distribution is adjusted for users outside the municipal boundary as described in Section 4.3; and
- An annual budget for infrastructure renewal of $324,000 is phased in over six years, in annual increments of $54,000. Asset renewal costs are allocated based on the functions of each asset group (Table 4-10), then distributed among customer classes based on the Hybrid Approach.

The resulting rate structure and average charges per customer class are shown in Table 4-11 and Figure 4-3.

Table 4-10. Asset Replacement Cost Allocation

Asset Description	Fire Protection	Commodity	Demand	Customer	Total
Service Connections				$1,576,000	$1,576,000
Zone Meters		$17,000	$33,000		$50,000
Customer Meters				$742,000	$742,000
Fire Hydrants	$580,000				$580,000
Pressure Regulating Station		$26,000	$54,000		$80,000
Valves	$71,000	$71,000	$212,000		$354,000
Mains	$584,000	$2,919,000	$8,173,000		$11,676,000
Groundwater Wells		$967,000	$967,000		$1,934,000
SCADA and Instrumentation		$33,000	$67,000		$100,000
Reservoir		$357,000	$714,000		$1,071,000
TOTAL	$1,235,000	$4,390,000	$10,220,000	$2,318,000	$18,163,000
	6.8%	24.2%	56.3%	12.8%	100.0%

Table 4-11. Rates Adjusted for Asset Renewal and Services Outside Boundary

Component		Allocation by Customer Class					
		Unmetered		Metered			
		Res.	ICI	Res.	ICI	OB	PNWS
$54,000 Asset Renewal Budget							
Fixed Annual Charge		$474	$1,323	$174	$682	$564	$1,285
Tier 1				$0.65	$0.00	$0.00	$0.00
Tier 2				$0.65	$0.64	$1.55	$0.80
$324,000 Asset Renewal Budget							
Fixed Annual Charge		$620	$1,795	$209	$803	$591	$1,819
Tier 1	per m^3			$0.77	$0.00	$0.00	$0.00
Tier 2	per m^3			$0.77	$1.02	$2.31	$1.10

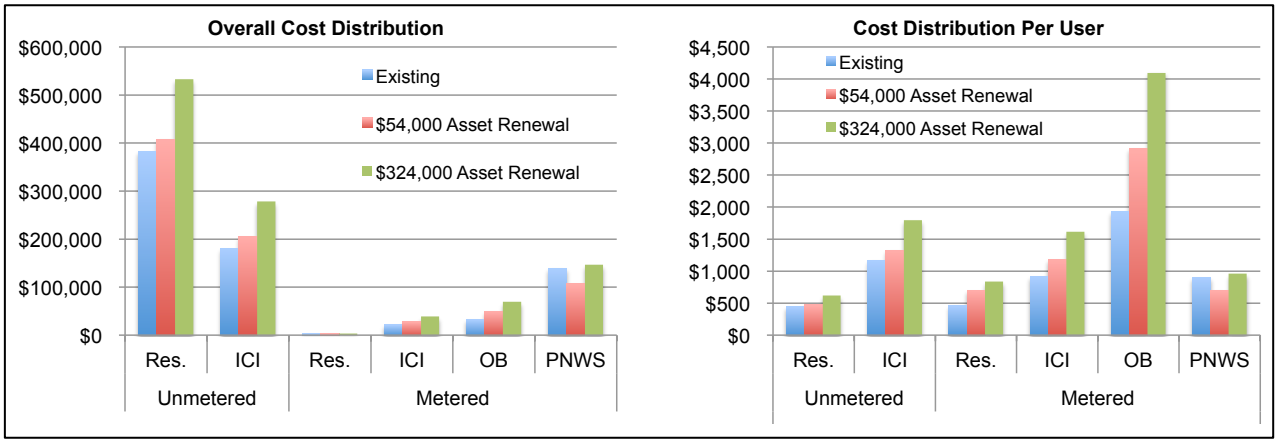


Figure 4-3. Hybrid Approach with Phased Asset Renewal Budgeting

5. Recommendations

Based on this review, the following actions are recommended:

1. Distribute the budgeted water user charge revenues among the six existing general customer classes in the following proportions (Hybrid Approach):

Residential Unmetered	51%
ICI Unmetered	26%
Residential Metered	0.3%
ICI Metered	3.6%
Outside Boundary - Retail	6.1%
Bulk (PNWS)	13%

2. Establish a budget for asset renewal. A long-term reinvestment strategy should be based on a detailed inventory and condition assessment of assets and stakeholder and public input on acceptable service levels; however, incremental budget increases in the order of $50,000 could be made annually in the interim to begin a gradual transition to a sustainable cost of service.
3. Seek consent of SLRD to provide ongoing water service to retail and bulk customers within its jurisdiction, including the PNWS, and negotiate terms of service including a fair return on the investment for related infrastructure.
4. Prepare an implementation plan for changes to water rates, including a detailed analysis of customer impacts, public and stakeholder engagement, and a phasing strategy.

5.1 Report Submission

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Revision History

Revision #	Date	Status	Revision	Author
1.0	April 26, 2013	Final Report		CPS

Appendix A – References

1. *Community Facts – Pemberton Village*. BC Stats. August 2012.

2. *Infraguide – Water and Sewer Rates: Full Cost Recovery*. Federation of Canadian Municpalities and National Research Council. 2006.

3. *Guide to the Amortization of Tangible Capital Assets*. Local Government Infrastructure and Finance Division, BC Ministry of Community Services. 2008

4. *Principles of Water Rates, Fees, and Charges – Manual of Water Supply Practices M1*. American Water Works Association. Sixth Edition, 2012.

5. *Review of Fire Protective Services for Fire Insurance Grading - Village of Pemberton*. CGI Municipal Consulting (Fire Underwriters' Survey). 2008.

6. *Village of Pemberton Termination of Water Services Bylaw No. 717, 2012 Time Line & Information Sheet*. Village of Pemberton, 2012.

7. *Village of Pemberton Termination of Water Services Bylaw No. 717, 2012 Information Sheet, Edition #2*. Village of Pemberton, 2012.

8. *Village of Pemberton Water Rate Study Report*. EarthTech (Canada) Ltd. January 2008.

Appendix B – Water Supply and Demand

Water Supply and Demand Village of Pemberton March 26, 2013

Supply Flow	Flow (m3/day)	Flow (MG/day)	YEAR	TOTAL (m3)	AVG (m3/day)	AVG BASE (m3/day)	BASE (m3)	SEASONAL (m3)	SEASONAL (% of TOTAL)	MAX DAY DEMAND (m3)	MDD / ADD	NOTE
			2009	785,903	2,153	1,514	552,712	233,191	0.30	4,088	1.90	partial year
OVERALL AVERAGE	2078	0.549	2010	741,368	2,031	1,600	584,113	157,254	0.21	4,118	2.03	
AVG BASE DEMAND	1606	0.424	2011	691,118	1,893	1,519	554,343	136,776	0.20	3,202	1.69	
Base % of total	77%		2012	822,479	2,249	1,740	635,242	187,237	0.23	3,864	1.72	major leak?
Seasonal % of total	23%									AVG	1.83	

Metered Demands (m3)	2010				2011				2012						
	Res.	ICI	Bulk	TOTAL	Res.	ICI	Bulk	TOTAL	IB Res.	IB ICI	OB Res	OB ICI	OB Bulk	TOTAL	IP
Accounts	24	21	1	46	25	22	1	48	6	6	15	2	1	48	18
Total Annual Demand	20,409	118,206	159,944	298,559	28,363	140,192	140,841	309,396	2,437	13,447	25,543	1,464	133,051	175,942	6,769
% of total supply	2.8%	15.9%	21.6%	40.3%	4.1%	20.3%	20.4%	44.8%	0.3%	1.6%	3.1%	0.2%	16.2%	21.4%	0.8%
Avg / acct (m3)	850	5,629	159,944		1,135	6,372	140,841		406	2,241	4,257	244	133,051	140,200	1,128
Base / acct (m3)	268	1,351	142,248		486	1,592	122,782		256	881	795	140	110,270	112,342	961
Base (% of total)	32%	24%	89%		43%	25%	87%		63%	39%	19%	57%	83%	261%	85%
Seasonal %	68%	76%	11%		57%	75%	13%		37%	61%	81%	43%	17%	239%	15%

Estimated 2012 Water Balance	In Boundary Res.	In Boundary ICI	Outside Boundary Retail	Outside Boundary Bulk	NRW	TOTAL	Separate Source IP	Note
Base								
Total accts	865	177	17	1		1,078	18	**Assumptions:**
Avg/acct (m3)	256	800	330	110,270			961	Residential per capita: 405 L/cap/day
Estimated Total (m3)	221,728	141,600	5,606	110,270	156,038	635,242	17,304	ICI - assume overall avg is 50% of metered avg.
Percent of total supply	34.9%	22.3%	0.9%	17.4%	24.6%	100.0%	2.7%	Bulk (PNWS - 154 connections) 716.04 m3/conn.
								Non-revenue water (NRW): 19% of annual total
Seasonal								
Avg/acct (m3)	100	321	1,259	22,781				Residential - assume seasonal is 28% of total
Estimated Total (m3)	86,500	56,743	21,401	22,781	(189)	187,237	3,003	ICI - assume seasonal is 29% of total
Percent of total supply	46.2%	30.3%	11.4%	12.2%	-0.1%	100.0%	1.6%	
Seasonal % of annual total	28.1%	28.6%	79.2%	17.1%	-0.1%	22.8%	14.8%	
ANNUAL TOTAL (m3)	**308,228**	**198,343**	**27,007**	**133,051**	**155,849**	**822,479**	**20,307**	Residential per capita: 405 L/cap/day
	37.5%	24.1%	3.3%	16.2%	18.9%	100.0%	2.5%	NRW is high: Overall demand trend suggests a major leak
Estimated Peaking Factors								**Source Capacity**
AAD (m3/d)	844	543	74	365	427	2,253	56	Well 192 982 m3/day
Summer Avg (m3/d)	1,080	698	132	427	426	2,764	64	Well 297 5,453 m3/day
Seasonal Peaking Factor	1.3	1.3	1.8	1.2	1.0	1.2	1.1	Well 3 4,320 m3/day
MDD Factor	1.9	1.9	2.7	1.8	1.0	1.8	1.7	
MDD (m3/d)	1,615	1,044	198	638	427	3,922	95	Reservoir 1,637 m3
% of MDD	41%	27%	5%	16%	11%	100%	2%	
PHD Factor	4.1	4.1	5.7	3.8	1.0	3.9	3.7	
PHD (lpm)	2,404	1,554	294	950	297	5,498	142	
% of PHD	44%	28%	5%	17%	5%	100%	3%	

System Peaking Factors		
MDD (FUS)	4,091	m3
MDD	3,818	m3
	2,651	lpm
PHD (FUS)	5,683	lpm
ADD	1,446	lpm

PHD factor	3.9
MDD factor	1.8

Service Connection Size Equivalents								
Assumed Avg Meter Size (mm)	19	50	19	150			50	
Capacity Equivalent	1	8	1	50			8	Based on relative flow capacity (proxy for life cycle cost)
Construction Cost Equivalent	1	4	1	10			4	Based on relative flow capacity (proxy for life cycle cost)
Factor Used for Cost Allocation	1	6	1	20			6	

Appendix C – Rate Analysis Worksheets

Rate Calculation for 2013 Village of Pemberton March 26, 2013

Customer Information

Component	Total	Allocation by Customer Class						Comments
		Unmetered		Metered				
		Residential	ICI	Residential	ICI	OB	PNWS	
Total annual volume (m^3)	662,270	305,804	173,755	2,437	20,216	27,007	133,051	2012 - Estimated for unmetered accts
Total seasonal volume (m3)	189,133	91,741	43,439	902	9,097	21,336	22,619	2012 - Estimated for unmetered accts
Seasonal % of total	29%	30%	25%	37%	45%	79%	17%	2013 - Estimated for unmetered accts
Estimated MDD peaking factor	1.8	1.9	1.9	1.9	2.4	5.7	1.8	Estimated from seaonal:annual ratios
Estimated Share of Total MDD	90%	40%	25%	0%	4%	5%	16%	Distribution losses assumed to account for 10% of MDD
Estimated Population	2,505	2,079		15		41	370	Assume pop. 2.42/acct. 153 res. accts on PNWS system.
No. of Accounts	1,062	859	155	6	24	17	1	From VoP

Units of Service

Component	Total	Allocation by Customer Class						Comments
		Unmetered		Metered				
		Residential	ICI	Residential	ICI	OB	PNWS	
Existing System								
Commodity (m3)	662,000	306,000	174,000	2,000	20,000	27,000	133,000	
Maximum Day (m3)	3,710	1,590	900	10	130	420	660	
Connections	1,062	859	155	6	24	17	1	
Residential connection equivalents	1,976	859	930	6	144	17	20	Assume res, OB = 1, ICI = 6, PNWS = 20

Costs to be Recovered by Rates

Component	Total	Allocation by Customer Class						Comments
		Unmetered		Metered				
		Residential	ICI	Residential	ICI	OB	PNWS	
Existing System								
Fire Protection Costs	$167,326	$137,676	$24,843	$962	$3,847	$0	$0	Allocated per connection
Commodity Costs	$200,582	$92,716	$52,721	$606	$6,060	$8,181	$40,298	Allocated based on annual total demand
Demand Costs	$286,357	$122,724	$69,467	$772	$10,034	$32,418	$50,942	Allocated based on estimated MDD
Customer Costs	$91,551	$39,799	$43,088	$278	$6,672	$788	$927	Allocated per residential connection equivalent
Total Cost	**$745,816**	**$392,915**	**$190,118**	**$2,617**	**$26,612**	**$41,386**	**$92,167**	

Calculated Water Rates Scenario 1 - Existing Rates (2012 - not adjusted for 2013 budget)

Component		Allocation by Customer Class						Comments
		Unmetered		Metered				
		Residential	ICI	Residential	ICI	OB	PNWS	
Annual Revenues per Account								
Frontage Tax		$102.20	$102.20	$102.20	$102.20			
Fixed Annual Charge per Account		$342.99	$1,063.18	$75.96	$486.44	$749.44	$749.44	
Tier 1				$284.32	$0.00	$0.00	$0.00	
Tier 2					$320.58	$1,177.29	$137,125.04	From water supply and demand spreadsheet
Tier 3								
Total Revenue per Account		**$445**	**$1,165**	**$462**	**$909**	**$1,927**	**$137,874**	
Overall Totals	**$758,280**	**$382,421**	**$180,634**	**$2,775**	**$21,821**	**$32,754**	**$137,874**	
Unit Rates								
Fixed Annual Charge per Account		$342.99	$1,063.18	$75.96	$486.44	$749.44	$749.44	
Tier 1	per m3			$0.70	$0.00	$0.00	$0.00	Up to 300m3/quarter, no consumption charge
Tier 2	per m3				$0.75	$1.04	$1.04	Uniform consumption charge above 300m3/quarter
Tier 3	per m3							

Calculated Water Rates Scenario 2 - Costs Reallocated within Existing Structure

Component		Allocation by Customer Class						Comments
		Unmetered		Metered				
		Residential	ICI	Residential	ICI	OB	PNWS	
Annual Revenues per Account								
Fixed Annual Charge per Account		$457	$1,227	$207	$738	$546	$927	Metered: Customer and FP (ICI + $300, OB + $500)
Tier 1				$230	$0	$0	$0	Metered: Commodity + Demand
Tier 2					$371	$1,888	$91,240	Metered: Commodity + Demand (ICI - $300, OB - $500))
Tier 3								
Total Revenue per Account		**$457**	**$1,227**	**$436**	**$1,109**	**$2,434**	**$92,167**	
Unit Rates								
Fixed Annual Charge per Account		$457	$1,227	$207	$738	$546	$927	
Tier 1	per m3			$0.57	$0.00	$0.00	$0.00	Up to 300m3/quarter, no consumption charge
Tier 2	per m3				$0.47	$1.24	$0.69	Uniform consumption charge above 300m3/quarter
Tier 3	per m3							

Calculated Water Rates Scenario 3 - Base + uniform consumption charges based on cost of service allocation

Component		Allocation by Customer Class						Comments
		Unmetered		Metered				
		Residential	ICI	Residential	ICI	OB	PNWS	
Annual Revenues per Account								
Fixed Annual Charge per Account		$457	$1,227	$207	$738	$546	$927	Metered: Customer and FP (ICI + $300, OB + $500)
Tier 1				$230	$371	$1,888	$91,240	Metered: Commodity costs (ICI -$300, OB - $500)
Tier 2								
Tier 3								
Total Revenue per Account		**$457**	**$1,227**	**$436**	**$1,109**	**$2,434**	**$92,167**	
Unit Rates								
Fixed Annual Charge per Account		$457	$1,227	$207	$738	$546	$927	
Tier 1	per m3			$0.57	$0.44	$1.19	$0.69	
Tier 2	per m3							
Tier 3	per m3							

Calculated Water Rates Scenario 4 - Base + Tiered consumption charges, based on cost of service allocation

Component		Allocation by Customer Class						Comments
		Unmetered		Metered				
		Residential	ICI	Residential	ICI	OB	PNWS	
Annual Revenues per Account								
Fixed Annual Charge per Account		$457	$1,227	$207	$438	$346	$927	Metered: Customer and FP costs (ICI +$300, OB +$500)
Tier 1 (base demand)				$101	$252	$281	$40,298	Metered: Commodity costs (ICI -$300, OB -$500)
Tier 2 (seasonal demand)				$329	$418	$1,907	$50,942	Metered: Demand costs
Tier 3 (excessive use)								Penalty tier - no revenue budgeted
Total Revenue per Account		**$457**	**$1,227**	**$636**	**$1,109**	**$2,534**	**$92,167**	
Unit Rates								
Fixed Annual Charge per Account		$457	$1,227	$207	$438	$346	$927	
Tier 1 (base demand)	per m3			$0.34	$0.52	$0.94	$0.37	
Tier 2 (seasonal demand)	per m3			$0.35	$1.11	$2.06	$2.24	
Tier 3 (excessive use)	per m3			$0.71	$2.22	$4.11	$4.47	2 x Tier 2 rate

Functional Cost Allocation for 2013 Village of Pemberton March 26, 2013

Allocation of Costs of Services - Operating and Administration Expense

Expense Item	Fire Protection Component	Commodity Component	Demand Component	Customer Component	Total Cost of Service	Note
Water - Administration	96,249	66,251	98,334	64,166	325,000	Proportional to direct costs, excluding hydro, chem.
Transfer to General	23,901	34,378	42,345	15,934	116,557	Assume surplus is xferred to general at y/e
Water - Insurance	4,442	3,058	4,538	2,962	15,000	Proportional to direct costs, excluding hydro, chem.
Water - Telephone		650	650		1,300	Assume SCADA for wellhouse and reservoir
Water - Hydro		22,500	22,500		45,000	Assume 100% supply/treatment
Water - Purchases	7,500	5,000	7,500	5,000	25,000	Allocations based on 2012 maint expense detail
Water - Legal	12,734	8,766	13,010	8,490	43,000	Proportional to direct costs, excluding hydro, chem.
Water - Engineering	3,000	2,000	3,000	2,000	10,000	Allocations based on 2012 maint expense detail
Water - Maintenance	19,500	13,000	19,500	13,000	65,000	Allocations based on 2012 maint expense detail
TOTAL	167,326	155,602	211,378	111,551	645,857	
	26%	24%	33%	17%	100%	

Allocation of Costs of Services - Capital and Reserve Expense

Expense Item	Fire Protection Component	Commodity Component	Demand Component	Customer Component	Total Cost of Service	Note
Water - Interest Expense		26,703	26,703		53,405	2002 reservoir and 2009 Well No. 1 upgrades
Water - Principal Payment		18,277	18,277		36,554	2002 reservoir and 2009 Well No. 1 upgrades
Project - General Expense - Water			30,000		30,000	Water connection compliance review and installation
Project - Capital Expense - Water			1,200,000		1,200,000	New reservoir - contingent on 100% grant funding
TOTAL	0	44,980	1,274,980	0	1,319,959	

Rate Revenue Requirement

Revenue/Expense Item	Fire Protection Component	Commodity Component	Demand Component	Customer Component	Total	Note
Revenue Allocation						
Operating and Admin Expense	167,326	155,602	211,378	111,551	645,857	
Capital and Reserve Expense	0	44,980	1,274,980	0	1,319,959	
Total Revenue Requirement	**167,326**	**200,582**	**1,486,357**	**111,551**	**1,965,816**	
Non-Rate Revenue						
Water - Connection Fees				(10,000)	(10,000)	
Water - Penalties				(5,000)	(5,000)	
Water - Investment Income				(5,000)	(5,000)	
Grant - Provincial Project - General			**(1,200,000)**		(1,200,000)	
Total Cost of Service to be Recovered	**167,326**	**200,582**	**286,357**	**91,551**	**745,816**	
Allocations - Percent of Total	22%	27%	38%	12%	100%	
				Check	745,816	OK

Allocation of Costs of Services - Tangible Capital Assets

Asset Description	Fire Protection Component	Commodity Component	Demand Component	Customer Component	Total	Note
ESTIMATED ASSET REPLACEMENT COSTS						
Service Connections				$1,576,378	$1,576,378	Earth Tech estimate, inflated to 2012
Zone Meters (5)		$16,667	$33,333		$50,000	Quantity from VoP
Customer Meters (64; various sizes)				$742,000	$742,000	Earth Tech estimate + 2010 project cost
Fire Hydrants (95)	$579,897				$579,897	Earth Tech unit cost, qty adjusted, inflated to 2013
Pressure Regulating Station (1)		$26,773	$53,545		$80,318	Earth Tech estimate, inflated to 2012
Valves (300)	$70,680	$70,680	$212,040		$353,400	Earth Tech estimate, inflated to 2012
Mains (24,500 metres)	$583,779	$2,918,897	$8,172,910		$11,675,586	Earth Tech estimate, inflated to 2012
Groundwater Wells (3)		$967,031	$967,031		$1,934,062	Cost of Well #3 was $602,000 in 2008
SCADA and flow data loggers		$33,333	$66,667		$100,000	lump sum - assume 3 SCADA sites, 30 loggers
Reservoir (1)		$356,970	$713,939		$1,070,909	Earth Tech estimate, inflated to 2012
TOTAL	$1,234,357	$4,390,350	$10,219,466	$2,318,378	$18,162,551	
	6.8%	24.2%	56.3%	12.8%	100.0%	

Village of Pemberton
2012 Operating Budget

CASH BASIS

GL Code	Description	2010 Actual Total	2011 Budget Total	2011 Actual	2012 Budget Total	Budget Variance 2012 vs. 2011	TEST YEAR BUDGET 2013	Row Notes
REVENUE								
03-27-7201-1675	Water - Other Contributions			(8,379)				
03-40-6100-1325	Water - User Rates	(441,669)	(509,750)	(470,435)	(484,545)	25,205	(485,000)	
03-40-6100-1326	Water - Frontage Taxes	(126,212)	(85,000)	(86,030)	(86,000)	(1,000)	(89,959)	
03-40-6100-1327	Water - Connection Fees	(12,681)	(17,500)	(11,395)	(10,000)	7,500	(10,000)	
03-40-6100-1329	Water - Penalties	(7,596)	(5,000)	(9,537)	(5,000)		(5,000)	
03-40-6100-1333	Water - 0B User Rates	(23,609)	(10,000)	(17,337)	(17,857)	(7,857)	(17,857)	Outside Boundary, residential and agricultural
03-40-6100-1334	Water - IP User Rates	(14,438)	(10,000)	(25,733)	(26,505)	(16,505)	(23,000)	Industrial Park
03-40-6100-1335	Water - PNID User Rates	(171,542)	(60,000)	(147,411)	(130,000)	(70,000)	(130,000)	SLRD Pemberton North Water Service
03-40-6600-1450	Water - Investment Income	(723)		(5,459)	(5,000)	(5,000)	(5,000)	
03-40-7200-1651	Water - Provincial Grants							
03-40-7200-1653	Grants - Water - MRIF							
03-40-7200-1654	Grants - Water - FCM							
03-40-7200-1671	Grant - Provincial Project - General		(10,000)		(10,000)		(1,200,000)	Gas Tax application submitted - reservoir
03-27-7201-1671	Grant - Water - Provincial Project - Capital	(711,173)						
03-40-7300-1925	Water - Other Revenue	(52,093)		(90)	(9,000)	(9,000)		
03-40-7400-1977	Water - DCC's	(278,634)						Flow through from DCC account if used
03-40-7500-1990	MFA Funding							
OPERATION AND MAINTENANCE EXPENSE								
03-40-8000-0000	Water - Administration	313,127	230,354	324,546	325,000	94,646	325,000	Adjusted 2012 to reflect higher actual cost than previously budgeted
03-40-8000-6006	Water - Insurance	9,576	10,000	17,573	18,000	8,000	15,000	
03-40-8000-6011	Water - Telephone	1,260	1,200	1,272	1,300	100	1,300	
03-40-8000-6012	Water - Hydro	31,731	30,000	24,305	30,000		45,000	
03-40-8000-6018	Water - Purchases	12,937	12,000	18,915	20,000	8,000	25,000	
03-40-8000-6106	Water - Bad Debt Expense	34,638		29,577				Annual writedown of PNWS A/R
03-40-8100-6101	Water - Legal		2,000	4,424	2,000		43,000	$40k for PNWS
03-40-8100-6102	Water - Engineering	4,090	8,500	983	28,670	20,170	10,000	Rate review
03-40-8200-0000	Water - Maintenance	91,781	75,000	69,724	77,000	2,000	65,000	
AMORTIZATION EXPENSE								
03-40-8250-6140	Amortization Expense - Water							Cash basis budgeting
TAXES AND TRANSFERS								
03-40-8800-6500	Transfer to General		140,000			(140,000)		
DEBT AND RESERVE EXPENSE								
03-40-8800-6509	Transfer to/from Future Reserves	(23,674)	40,723		145,747	105,024		
03-40-8900-0925	Water - Interest Expense	44,472	57,519	36,818	47,736	(9,783)	53,405	2002 reservoir and 2009 Well No. 1 upgrades
03-40-8900-6527	Water - Principal Payment	26,954	26,954	26,954	26,954		36,554	2002 reservoir and 2009 Well No. 1 upgrades
RATE FUNDED CAPITAL EXPENSE								
03-40-9000-6558	Capital Exp. - Water System	1,140,149		5,384				
03-40-7200-6500	Project - General Expense - Water		25,000		61,500	36,500	30,000	Water connection compliance review and installation
03-40-7201-6504	Project - Capital Expense - Water		48,000			(48,000)	1,200,000	New reservoir
03-40-9100-6017	Water - Other Expenses	3,447						
	Report Totals	**(149,882)**		**(221,329)**			**(116,557)**	
TOTAL REVENUE		(1,840,370)	(707,250)	(781,805)	(783,907)	(76,657)	(1,965,816)	
TOTAL EXPENSE		1,690,488	707,250	560,476	783,907	76,657	1,849,259	
NET DEFICIT (SURPLUS)		(149,882)		(221,329)			(116,557)	

Village of Pemberton
2012 Operating Budget

CASH BASIS

GL Code	Description	2010 Actual Total	2011 Budget Total	2011 Actual	2012 Budget Total	Budget Variance 2012 vs. 2011	TEST YEAR BUDGET 2013	Row Notes
OPERATING R&E SUMMARY								
	PARCEL TAX	(441,669)	(509,750)	(470,435)	(484,545)	25,205	(89,959)	
	USER CHARGES	(170,098)	(117,500)	(124,299)	(118,857)	(1,357)	(655,857)	
	DEVELOPMENT CHARGES	(278,634)						
	GRANTS	(711,173)	(10,000)		(10,000)		(1,200,000)	
	OTHER REVENUE	(238,796)	(70,000)	(187,071)	(170,505)	(100,505)	(158,000)	
TOTAL REVENUE		(1,840,370)	(707,250)	(781,805)	(783,907)	(76,657)	(2,103,816)	
	OPERATING EXPENSE	141,799	126,700	115,200	156,970	30,270	146,300	
	ADMINISTRATION EXPENSE	360,788	242,354	376,120	345,000	102,646	383,000	
	AMORTIZATION EXPENSE							
	TAXES AND TRANSFERS	1,116,475	253,723	5,384	207,247	(46,476)	1,230,000	
	DEBT EXPENSE	71,426	84,473	63,772	74,690	(9,783)	89,959	
TOTAL EXPENSE		1,690,488	707,250	560,476	783,907	76,657	1,849,259	
NET DEFICIT (SURPLUS)		(149,882)		(221,329)			(254,557)	
TANGIBLE CAPITAL ASSETS								
	COST							
	Balance at 1 January	3,297,909		4,438,058			4,443,442	Plant in Service = total of original costs of TCA in useful service (used
	Disposals							Revenue from sale of assets
	Additions	1,140,149		5,384			5,384	Cost of acquisition of new assets
	Balance at 31 December	4,438,058		4,443,442			4,448,826	
	ACCUMULATED AMORTIZATION							
	Balance at 1 January	630,000		3,719,358			3,636,735	
03-40-8250-6140	Amortization Expense - Water	87,900		88,007			88,007	
	Balance at 31 December	718,700		806,707			894,715	Cumulative value of annual amortization of all assets since new: Also
	NET BOOK VALUE AT 31 DECEMBER	3,719,358		3,636,735			3,554,111	Rate Base (AWWA M1 methodology)
RESERVE FUNDS	(Balance at December 31)							
	Water - General	7,409		7,409			7,409	

Water Conections and Customers Information

Village of Pemberton

March 26, 2013

1. Dwelling Occupancy

Single Family	2.41
Townhouse	2.41
Apartment	2.41
Suite	2.41

BC Stats - 2011 Census population / private occupied dwellings. Data were not available for different categories of dwelling, so the overall average is used.

2. Water Connections

2012 Connections

	Metered	Unmetered	
Customer Type			SOURCE: "Water Rates Study Customer Base, 2010-2012" spreadsheet, Village of Pemberton (N. Gilmore)
Single Family - Existing	25	838	21 of 25 metered connections are outside municipal boundary
Single Family - New Construction		17	17 new connections in 2012 (2011 was 838). 34 connections were added 2010-2011.
Multi-Family			
Townhouse			Included above, or in commercial. No MFR category in customer data provided.
Apartments			
Suites			
ICI	25	154	Grew at one connection per year 2010-12
Bulk water supply	1		
Totals	51	1009	
Total Metered and Unmetered		1060	

Assumptions:
Each connection represents one customer, and one account.

Total Residential Dwellings	1,133	BC Stats (2011 Census)	979	occupied dwellings	+	154	connections PNWS

Rate Calculation for 2013 Village of Pemberton **UTILITY BASIS - OUTSIDE BOUNDARY ACCOUNTS** March 26, 2013

Customer Information

Component	Total	Allocation by Customer Class						Comments
		Unmetered		Metered				
		Residential	ICI	Residential	ICI	OB	PNWS	
Total annual volume (m^3)	662,270	305,804	173,755	2,437	20,216	27,007	133,051	2012 - Estimated for unmetered accts
Total seasonal volume (m3)	189,133	91,741	43,439	902	9,097	21,336	22,619	2012 - Estimated for unmetered accts
Seasonal % of total	29%	30%	25%	37%	45%	79%	17%	2013 - Estimated for unmetered accts
Estimated MDD peaking factor	1.8	1.9	1.9	1.9	2.4	5.7	1.8	Estimated from seaonal:annual ratios
Estimated Share of Total MDD	90%	40%	25%	0%	4%	5%	16%	Distribution losses assumed to account for 10% of MDD
Estimated Population	2,505	2,079		15		41	370	Assume pop. 2.42/acct. 153 res. accts on PNWS system.
No. of Accounts	1,062	859	155	6	24	17	1	From VoP

Units of Service

Component	Total	Allocation by Customer Class						Comments
		Unmetered		Metered				
		Residential	ICI	Residential	ICI	OB	PNWS	
Existing System								
Commodity (m3)	662,000	306,000	174,000	2,000	20,000	27,000	133,000	
Maximum Day (m3)	3,710	1,590	900	10	130	420	660	
Connections	1,062	859	155	6	24	17	1	
Residential connection equivalents	1,976	859	930	6	144	17	20	Assume res, OB = 1, ICI = 6, PNWS = 20

Costs to be Recovered by Rates **UTILITY BASIS - OUTSIDE BOUNDARY ACCOUNTS**

Component	Total	Allocation by Customer Class						Comments
		Unmetered		Metered				
		Residential	ICI	Residential	ICI	OB	PNWS	
Existing System								
Fire Protection Costs	$180,545	$148,552	$26,805	$1,038	$4,150	$0	$0	Allocated per connection
Commodity Costs	$202,619	$93,658	$53,256	$612	$6,121	$8,264	$40,708	Allocated based on annual total demand
Demand Costs	$320,820	$137,494	$77,827	$865	$11,242	$36,319	$57,073	Allocated based on estimated MDD
Customer Costs	$116,379	$50,592	$54,774	$353	$8,481	$1,001	$1,178	Allocated per residential connection equivalent
Total Cost	**$820,364**	**$430,297**	**$212,662**	**$2,868**	**$29,995**	**$45,584**	**$98,959**	**Recoverable costs for OB and PNWS**

Remainder of cash-basis cost is allocated to inside boundary accounts

$745,816	**Cash basis revenue requirement**
($45,584)	
($98,959)	
$601,273	

Costs to be Recovered by Rates **CASH NEEDS BASIS - INSIDE BOUNDARY ACCOUNTS**

Component	Total	Allocation by Customer Class						Comments
		Unmetered		Metered				
		Residential	ICI	Residential	ICI			
Existing System								
Fire Protection Costs	$134,898	$110,993	$20,028	$775	$3,101			Allocated per connection
Commodity Costs	$161,708	$98,571	$56,050	$644	$6,443			Allocated based on annual total demand
Demand Costs	$230,860	$139,569	$79,001	$878	$11,411			Allocated based on estimated MDD
Customer Costs	$73,808	$32,698	$35,400	$228	$5,481			Allocated per residential connection equivalent
Total Cost	**$601,273**	**$381,831**	**$190,480**	**$2,526**	**$26,436**			**Recoverable costs for OB and PNWS**

Costs to be Recovered by Rates **HYBRID APPROACH**

Component	Total	Allocation by Customer Class						Comments
		Unmetered		Metered				
		Residential	ICI	Residential	ICI	OB	PNWS	
Existing System								
Fire Protection Costs	$134,898	$110,993	$20,028	$775	$3,101	$0	$0	Allocated per connection
Commodity Costs	$210,679	$98,571	$56,050	$644	$6,443	$8,264	$40,708	Allocated based on annual total demand
Demand Costs	$324,252	$139,569	$79,001	$878	$11,411	$36,319	$57,073	Allocated based on estimated MDD
Customer Costs	$75,987	$32,698	$35,400	$228	$5,481	$1,001	$1,178	Allocated per residential connection equivalent
Total Cost	**$745,816**	**$381,831**	**$190,480**	**$2,526**	**$26,436**	**$45,584**	**$98,959**	**Recoverable costs for OB and PNWS**

Calculated Water Rates Costs Adjusted for Outside Boundary Connections (Hybrid Approach)

Component		Allocation by Customer Class						Comments
		Unmetered		Metered				
		Residential	ICI	Residential	ICI	OB	PNWS	
Annual Revenues per Account								
Fixed Annual Charge per Account		$445	$1,229	$167	$658	$559	$1,178	Metered: Customer and FP (ICI + $300, OB + $500)
Tier 1				$254	$0	$0	$0	Metered: Commodity + Demand
Tier 2					$444	$2,123	$97,781	Metered: Commodity + Demand (ICI - $300, OB - $500))
Tier 3								
Total Revenue per Account		**$445**	**$1,229**	**$421**	**$1,102**	**$2,681**	**$98,959**	
Unit Rates								
Fixed Annual Charge per Account		$445	$1,229	$167	$658	$559	$1,178	
Tier 1	per m3			$0.62	$0.00	$0.00	$0.00	Up to 300m3/quarter, no consumption charge
Tier 2	per m3				$0.56	$1.40	$0.74	Uniform consumption charge above 300m3/quarter
Tier 3	per m3							

Funding for Asset Renewal

	Total	Residential	ICI	Residential	ICI	OB	PNWS	
TOTAL	**$54,000**	$25,171	$14,632	$164	$2,050	$4,006	$7,977	Phase in approx. $324,000 TCA renewal budget
Fire Protection Costs	$3,670	$3,020	$545	$21	$84	$0	$0	Functional allocation is based on the TCA allocation table, and distribution of functional costs among customer classes is proportional to hybrid allocation table values.
Commodity Costs	$13,053	$6,107	$3,473	$40	$399	$512	$2,522	
Demand Costs	$30,384	$13,078	$7,403	$82	$1,069	$3,403	$5,348	
Customer Costs	$6,893	$2,966	$3,211	$21	$497	$91	$107	

Total with Asset Renewal	**$799,816**	**$407,002**	**$205,111**	**$2,690**	**$28,486**	**$49,591**	**$106,936**
	100.0%	50.9%	25.6%	0.34%	3.56%	6.20%	13.4%

Calculated Water Rates Scenario 5 - Hybrid Approach With Asset Renewal

Component		Allocation by Customer Class						Comments
		Unmetered		Metered				
		Residential	ICI	Residential	ICI	OB	PNWS	
Annual Revenues per Account								
Fixed Annual Charge per Account		$474	$1,323	$174	$682	$564	$1,285	Metered: Customer and FP (ICI + $300, OB + $500)
Tier 1				$264	$0	$0	$0	Metered: Commodity + Demand
Tier 2				$264	$505	$2,353	$105,651	Metered: Commodity + Demand (ICI - $300, OB - $500))
Tier 3								
Total Revenue per Account		**$474**	**$1,323**	**$702**	**$1,187**	**$2,917**	**$106,936**	
Overall Totals	**$801,338**	**$407,002**	**$205,111**	**$4,212**	**$28,486**	**$49,591**	**$106,936**	
Unit Rates								
Fixed Annual Charge per Account		$474	$1,323	$174	$682	$564	$1,285	
Tier 1	per m3			$0.65	$0.00	$0.00	$0.00	Up to 300m3/quarter, no consumption charge
Tier 2	per m3			$0.65	$0.64	$1.55	$0.80	Uniform consumption charge above 300m3/quarter
Tier 3	per m3							